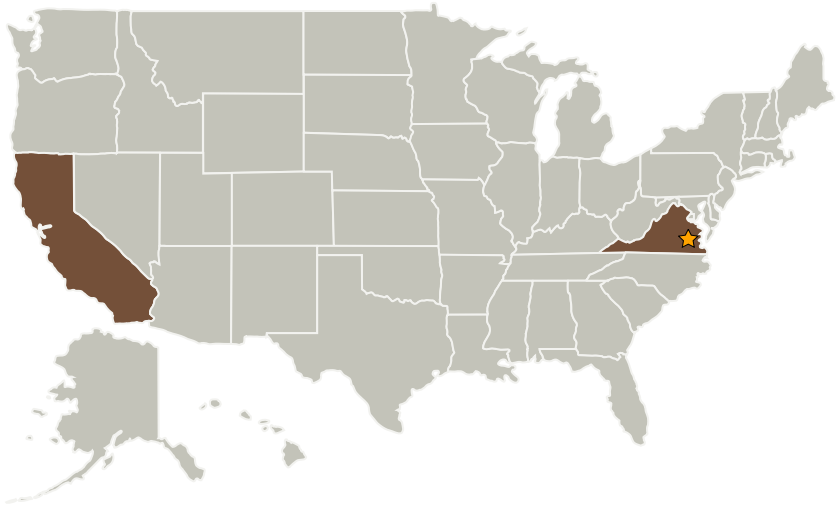
One-Dimensional Tunable Photonic-Crystal IR Filter, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

MetroLaser proposes to design and develop an innovative narrowband tunable IR filter based on the properties of a one-dimensional photonic crystal structure with a resonant cavity. Such structure would exhibit an ultra-narrow, high-throughput band in the middle of a wide, low-transmission stop-band. During Phase I, through an extensive and detailed analysis, we performed a feasibility study to establish the operational characteristics and performance of the proposed tunable filter. Following this, we assembled and tested a breadboard and demonstrated filter tunability over 4 cm 1 with bandpass close to 0.25 cm-1, rejection level better than 23 dB, and acceptance angle of about 1 degree at 10.6 microns. The acquired data demonstrated our optimal approach for designing and constructing an ultra-narrow tunable optical bandpass filter. During Phase II, we will design, build, deliver to NASA, and perform field testing of a compact and robust prototype module of a 1" diameter narrowband filter with a tunability range of 10 cm-1, a bandpass range of 0.1 cm-1, background rejection of 30 dB, and transmittance better than 50%. A rugged and monolithic filter design will allow this instrument to be incorporated in air- or space-based platforms providing stable performance in harsh operating environments.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
MetroLaser, Inc.	Supporting Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Laguna Hills, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

December 2006: Project Start

November 2008: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.4 Remediation